

of the balloon and caught in the basket, causing throwing out of ballast. Storm continued until 5 o'clock in the morning. About 12 o'clock, hearing the sound of running water, balloon descended and landed in the top of a tree, staying there until 3 a. m., when a sudden gust of wind tore it loose. Dropped some ballast and rose and fell again suddenly, touching the ground. Balloon stayed about in the same place for one and one-half hours, going up and down alternately with the currents of air. Then it got out of this "pocket" in the mountains and ascended to 2438 meters. Ballast being low, descended near Butternut. Would have had to come down otherwise on account of extreme thirst and hunger. The water which rolled down the side of the balloon was unfit to drink, being tainted by the gas.

Omitting three hours in the tree, the rate of speed was 20.99 kilometers per hour. Statescope got wet and was erratic.

Monday, June 25, 1906.—Balloon "Sky Lark"; capacity, 510 cubic meters; hydrogen gas used; occupants, Leo Stevens, Maj. C. J. S. Miller, Charles Levee; ballast taken, 95.256 kilograms; ballast used, 86.18 kilograms; ascent at Franklin, Pa., 2:40 p. m.; descent at Woodhill, Pa., 5:10 p. m.; elapsed time, 2 hours and 30 minutes; distance, 49.89 kilometers; speed per hour, 19.95 kilometers; general direction, east; highest altitude, 5900 meters.

Balloon crossed the Allegheny River and French Creek.

Wednesday, July 11, 1906.—Balloon "Nirvana"; capacity, 1500 cubic meters; coal gas used; pilot and passenger, Dr. Julian P. Thomas, Roy Knabenshue; ascent at One hundred and thirty-eighth street, New York City, 4 p. m.; descent at Flatbush, Brooklyn, N. Y., 7:45 p. m.; elapsed time, 3 hours and 45 minutes; distance in kilometers, 17.70; speed per hour, 4.72 kilometers; general direction, south.

Experiments made with a barrel and rope in East River as a "sea anchor" at an elevation of about 250 feet. In passing over the city the crowd caught the guide rope and held the balloon, being very close to a hot chimney at the time, with the danger of igniting the gas.

Monday, July 16, 1906.—Balloon "Centaur"; capacity, 1200 cubic meters; coal gas used; pilot and passengers, Leo Stevens, James H. Hare, Charles Levee; ballast taken, 29.48 kilograms; all used; ascent at Clifton, Staten Island, N. Y., at 2:10 p. m.; descent made in Flushing Bay, Long Island Sound, opposite Classons Point, Long Island, N. Y., at 3:30 p. m.; elapsed time, 1 hour and 20 minutes; distance in kilometers, 24.14; speed per hour, 18.10 kilometers; general direction, northeast; highest altitude, 1188 meters.

Gas was very poor. Experimented with sea anchor of canvas in Flush-

ing Bay. Balloon collided with a house in leaving the ground, but no damage was done. After cutting free from the sea anchor the balloon rose a few feet and fell into the water alternately several times. The balloon descended at last upon a small sailing vessel and the occupants were helped out of the basket. Beyond some injuries to the envelope and the loss of a valuable photographic apparatus there was no serious damage done.

Tuesday, July 19, 1906.—Balloon "Nirvana"; capacity, 1500 cubic meters; coal gas used; pilot and passengers, Roy Knabenshue, Dr. Julian P. Thomas, Mrs. Thomas; ballast taken, 362.88 kilograms; ascent at One hundred and thirty-eighth street, New York City, 2:30 p. m.; descent at Woodcliff, N. J.; manner of landing, valve; distance, counting each leg of a zigzag course, 36.62 kilometers; general direction, southwest; highest altitude, 2743 meters.

A moving picture machine (kinetograph) was carried, weighing about 22.68 kilograms. Balloon traveled first southwest, then northeast, southwest again, northwest and west to landing place, having crossed East River twice and Hudson River once. Drag rope caught by crowd in One hundred and sixth street and balloon pulled to earth. Crowd let go later and balloon ascended. In crossing the Hudson the gas quickly cooled, bringing balloon down into the water. Threw out anchor and ascended. Anchor pulled out and balloon drifted over to the shore when the anchor was caught and descent made easily.

Saturday, July 23, 1906.—Balloon "America"; capacity, 400 cubic meters; coal gas used; pilot and passengers, Charles Walsh (?); ballast taken, 35 kilograms; ballast used, 20 kilograms; ascent at One hundred and thirty-eighth street, New York City, at 3:40 p. m.; descent at East Norwalk, Conn., at 5:45 p. m.; manner of landing, valve; elapsed time, 2 hours and 5 minutes; distance, 57.94 kilometers; speed per hour, 27.81 kilometers; general direction, northeast; highest altitude, 2000 meters.

Balloon left for the north, but, owing to expansion and reaching upper currents, it took an easterly direction. Condensation brought the balloon down above the Sound, taking the lower current, which was blowing north; crossed the Sound with the guide rope until nearing Stamford, Conn.; followed the shore until landing was made on the farm of C. F. Sherwood, East Norwalk, Conn.; used valve for landing and was brought to the ground by the people, who caught the guide rope; no damage whatever, and received all the assistance necessary; one hour from the time of landing was ready to ship back; beautiful ascension, but weather was misty. Total distance covered about 80 kilometers, making speed per hour about 40 kilometers.

FORECASTS AND WARNINGS.

By Prof. E. B. GARRIOTT, in charge of Forecast Division.

Atmospheric pressure was high over the British Isles until the third decade of the month, when the passage of an area of low barometer was attended by exceptionally heavy rain. In the vicinity of the Azores the barometer was high, except from the 1st to 4th and 14th to 20th, when slight barometric depressions covered that region.

In the middle and northern districts of the United States east of the Rocky Mountains and in the east Gulf and South Atlantic States there was an unusual prevalence of thunderstorms, and in many portions of these districts the rainfall was excessive. In the west Gulf States a period of drought was broken on the 25th.

The most notable barometric disturbance of the month in the region of observation appeared on the north Pacific coast of the United States on the 3d and advanced to North Dakota, where, on the morning of the 7th, the remarkably low reading of 28.68 inches was reported. On the 6th tornadoes occurred in eastern Minnesota and western Wisconsin. After the 7th this disturbance drifted slowly eastward, with diminishing intensity, and reached the Canadian Maritime Provinces on the 10th, attended on the 8th by severe local storms in Ontario. During the second decade of the month two disturbances advanced northward from the vicinity of western Cuba, attended by heavy rain in the Southeastern States.

Moderate temperature prevailed until the closing days of June, when a warm wave extended over the middle and northern districts east of the Rocky Mountains. In the first decade of the month and from the 21st to 25th frost occurred in the northern Rocky Mountain and Plateau districts, and on the 23d and 24th snow fell in Wyoming. From the 11th to 13th a frost-bearing cool wave advanced from the upper Mississippi Valley over the interior of New York and New England.

BOSTON FORECAST DISTRICT.

The weather of the month was fairly characteristic of the season. The precipitation, which was copious, resulted largely from showers and local storms, and was rather unevenly distributed. It was particularly heavy in the southwest portion of Maine, the southeast sections of New Hampshire, and extreme northern Vermont. In several instances heavy local rains were attended by hail and thunderstorms of marked severity. The temperature averaged slightly below normal and there were no marked extremes of temperature. There were no heavy gales along the coast, and the only delay or inconvenience to shipping resulted from fog. No storm warnings were displayed. Frost warnings were issued to cranberry growers on the 12th and were verified by light to moderate frosts.—J. W. Smith, District Forecaster.

NEW ORLEANS FORECAST DISTRICT.

Rainfall was generally deficient, and in some sections of the west Gulf States the month was exceptionally dry. No special warnings were issued and no storm occurred on the coast.—I. M. Cline, District Forecaster.

LOUISVILLE FORECAST DISTRICT.

The warm periods of the month were from the 6th to 10th and 27th to 30th, and the cool periods from the 11th to 15th and 19th to 21st. The rain periods of the month were from the 1st to 6th, 9th to 11th, and 13th to 26th. No special warnings were issued and no weather conditions occurred that would have justified them.—F. J. Walz, District Forecaster.

CHICAGO FORECAST DISTRICT.

While no unusually severe storms passed over the upper Lakes, warnings were issued on the 6-7th and 21st, the latter order being for western Lake Superior only. Special frost

warnings were issued for the cranberry marshes of Wisconsin on the 1st, and 10th to 13th, and also for the northern portion of the district on the 20th. The warnings were timely and accurate, and no frost occurred without warnings.—*H. J. Cox, Professor and District Forecaster.*

DENVER FORECAST DISTRICT.

Over the greater portion of the Rocky Mountain districts the month was colder than usual, with several prolonged periods of low temperature. No special warnings were issued or needed. Owing to a rapid melting of snow near the Continental Divide the Grand River and streams rising in the San Juan Mountains, in the southwestern part of Colorado, were at flood stage during a part of the second decade of the month. No great damage resulted.—*F. H. Brandenburg, District Forecaster.*

SAN FRANCISCO FORECAST DISTRICT.

The month was unusually rainy. In the last fifty-seven years the rainfall in June in San Francisco has exceeded that of the present season only four times. On the 2d southeast storm warnings were displayed along the coast from Fort Harford north. This is the first time in the knowledge of the observer that warnings have been displayed in June. Rain fell generally in northern California, with high southerly winds. Throughout the month there was a tendency for north coast lows to extend southeast over Nevada, with a circulation more or less sluggish. The north Pacific seasonal high seems to have extended but little east of the coast line and apparently retreated somewhat west of its usual position. An excellent illustration of the result of such a pressure distribution is shown on June 10 and 11, and again on June 14 and 15. The month was singularly free from intense or prolonged hot spells.—*A. G. McAdie, Professor and District Forecaster.*

PORTLAND, OREG., FORECAST DISTRICT.

The month was unusually wet and the temperature averaged below the normal. Storm warnings ordered on the 3d and 11th were fully justified. Several light frosts occurred east of the Cascade Mountains for which, as a rule, timely warn-

ings were issued. The Columbia River rose slowly during the entire month, but did not reach a flood stage at any point in this district.—*E. A. Beals, District Forecaster.*

RIVERS AND FLOODS.

There were no high waters of great consequence during the month in the rivers on which river and flood service is maintained. The heavy rains of the early portion of the month in eastern Kansas, southwestern Missouri, and Arkansas caused flood stages in a considerable portion of the Neosho River, and comparatively high stages in the lower Arkansas River. The Missouri River was quite high from Bismarck southward, but did not reach flood stages. The crest of the rise passed Wolfpoint, Mont., on the 9th, Bismarck on the 11th, Sioux City on the 16th, Omaha on the 18th, Kansas City on the 21st, and Hermann, Mo., on the 24th, showing at St. Louis on the Mississippi River on the 25th. In the Mississippi River the stages were about normal for the season.

There was a sharp rise in the Brazos River of Texas from the 1st to the 9th, but the crest stages were from 4 to 17 feet below the flood stages. The Trinity River was also high at the same time, and the stages varied from 5 to 14 feet above the flood stages, except over the extreme lower portion of the river. Warnings and advices were issued for both rivers, beginning on May 31.

The Columbia River fell steadily throughout the month.

The highest and lowest water, mean stage, and monthly range at 285 river stations are given in Table VI. Hydrographs for typical points on seven principal rivers are shown on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—*H. C. Frankenfield, Professor of Meteorology.*

NOTE.—The term, "danger line", will no longer be used in designating the overflow stages of rivers. As a substitute the words "flood stage" will be used, the term meaning the lowest stage of water at which overflow will begin.

THE WEATHER OF THE MONTH.

By Mr. P. C. DAY, Assistant Chief, Division of Meteorological Records.

PRESSURE.

The distribution of mean atmospheric pressure is graphically shown on Chart VI, and the average values and departures from normal are shown in Tables I and V.

The pressure during June, 1906, was low over all parts of the United States and Canada, except over a small area embracing the northern Rocky Mountain districts and extending southwest over Nevada and California and west over Oregon and Washington to the Cascade Mountains, where the pressure was slightly above normal.

The high pressure area with averages above 30.00 inches normally overlying the South Atlantic and East Gulf States and extending eastward into the Atlantic, was much reduced in intensity during the current month, falling considerably below 30.00 inches.

Pressure much below the normal prevailed throughout the Lake region and extended far to the northwestward over Manitoba, Alberta, and the Saskatchewan districts of Canada. At Prince Albert, Saskatchewan, the pressure averaged 0.15 inch below the normal.

Over the Pacific coast and southern Rocky Mountain districts the pressure distribution was not materially different from the average.

The normal change in pressure from May to June shows a large area from western Texas northeastward to the Lakes and eastward to the Atlantic, with a considerable increase in pressure. North and west of this region there is a general decrease in pressure from May.

During the current month nearly all sections showed marked decreases in pressure from the values for May, 1906, and especially from the Gulf coast northward to the Lakes and northwestward over Canada. Over a small region embracing Oregon and Washington, and extending eastward as far as Colorado, the pressure for June was slightly above that for the preceding month. The marked decrease of pressure northward brought nearly all districts east of the Rocky Mountains under the influence of southerly winds and confined the storm tracks, as a rule, well to the north.

TEMPERATURE.

The mean temperature for the month over the greater portion of the interior of the United States was well below the average. Over the greater part of the western plains and mountain region and extending almost to the Pacific coast, the temperature averaged from 2° to 4° below normal. Over the Great Valley of California temperatures were again well below the average, Red Bluff, Cal., showing an average deficiency of more than 5° daily. Over the Lake region, Atlantic and Gulf States, the Rio Grande Valley, and the south Pacific coast the temperature was generally in excess of the average. Maximum temperatures, as a rule, were not excessive, but few points showing as high as 100°, except over western Texas, the southern parts of New Mexico and Arizona, and the interior of southern California. Maximum temperatures of 110° were recorded at a few points in the desert regions of southwestern Arizona and southeastern California. Temperatures below freezing were not recorded, except over extreme northern